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the river the food supply in smaller and larger plankton organisms is greatly increased.

The results of levees preventing overflow of the bottoms, together with the draining of the tributary lakes operate in the opposite direction. These stagnant and semi-stagnant waters are perpetually productive of plankton and feed the river with it. With the progressive elimination of the sources a further reduction in the river plankton may be expected.

The total effects of the changing conditions, expressed in terms of the fisheries, are interesting. The increase of yield of fish for the five years preceding the opening of the drainage canal was about 9 per cent per annum; that for the eight years following averaged an annual increase of about 3.5 per cent; while for the next four years there was an average *decrease* of 15 per cent per annum, based on statistics from Havana.

Three factors during this time tended to increase the yield; the introduction of the sewage with its increase of organisms; the rapid increase of European carp which in 1908 furnished 64 per cent of the total product; and increased interest in fishing due to this increase. The rapid progress of reclamation would operate to diminish the yield. The factor of increased fishing doubtless operated in the same way for the later years. The catch was greater than the increase.

It is the purpose of the Survey to find by investigation the treatment, both of the river itself and its adjacent and tributary regions, which may so far as possible allow the maintenance of the fishery properties of the state.

FROGS AND TOADS IN BERMUDA

Pope (Bul. Mus. Comp. Zool. Harvard Coll. May 1917) presents a brief account of the three species of Anura found in the Bermudas. These are *Bufo agua*, the Great Surinam Toad; *Eleutherodactylus johnstonei*, the "whistling" tree frog; and *E. luteolus*. No amphibian is native to Bermuda. The Bufo was imported from British Guiana to capture garden insects, about 1885. The "whistling frog" is thought to have been brought from the Barbadoes, and is known to the Islands as far back as 1880. The *E. luteolus* was discovered in 1916, and nothing is known as to its origin.

There are two points of unusual interest in connection with the situation. The first is that *Bufo agua* is the largest of living toads.

The second is the extremely unfavorable conditions in the Bermudas for amphibians. The limestone of the Islands is so porous that the rain water which falls on the land quickly seeps back to the sea. There are no streams and no permanent pools. The tadpoles of the Great toad have become able to develop in brackish water. In *E. johnstonei* the entire larval development takes place in the egg, and the frog hatches out in the adult form. All that is necessary therefore is that the eggs be laid in moist places—as under leaves and stones.

The first two species grew in numbers rapidly within a few years after introduction, but later gradually established a balance at somewhat lower numbers.

GONADS AS CONTROLLERS OF SOMATIC AND PSYCHICAL QUALITIES

Moore (J. Exp. Zool., May 1919) reports experiments on rats confirming in part Steinach's conclusions respecting the effect of grafting ovarian tissues in completely castrated males. Steinach found that such "feminized males" behaved more like females than males both physiologically and psychically. Growth of mammary glands and the secretion of milk were noted in such males. Similarly females in which testicular tissue was substituted for the ovaries resembled males both in body and temperament.

In these grafting experiments two distinct changes are wrought:—the native sex bodies are removed, and bodies of the opposite sex are inserted. It is necessary therefore, to observe as controls both uncastrated animals, and castrated ones into which no exogenous elements have been introduced.

The distinguishing characteristics of the sexes in the white rats are not sharply marked in features other than the sexual organs themselves. The growth curves of weight and body length differ somewhat in males and females, the male being somewhat higher. Castration of male rats seems not to modify the growth curve, while spaying the female increases the curve over that of the normal female. Hair, mammary glands, changes in skeleton, and fat deposit have all been suggested as presenting differences. The author, however, feels that there is too much variation in all these things for them to have any exact value as criteria. He holds that the characteristic *behavior* of the sexes gives much better means of